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SIPHONAPTERA
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2. SIPHONAPTERA

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(With 6 Text-Figures and Plate IV)

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THOUGH the collection of fourteen species represents but a small percentage of the fleas occurring in the countries visited by the Expedition, the material is nevertheless of particular interest, not only containing four new species,¹ but enabling us to supplement the original accounts of several of the other species. No fewer than five of the fourteen species belong to *Ctenophthalmus* Kolenati; the fact that two of them are new may be taken as evidence that still more species of this genus await discovery in tropical Africa. The distribution of *Ctenophthalmus* presents a puzzling problem, there being two centres:

1. The Palaearctic Region with very numerous species, a few occurring as far south as North Africa and Burma, a single one being found in the Nearctic Region, and none being known from Japan, Southern India, the Malay Archipelago and Australia.

2. Tropical Africa with eighteen species and some subspecies, none of them very closely related to Palaearctic species, only one species being found in South Africa.

The area of the Aethiopian species is separated from the Palaearctic centre of distribution by the Sahara without any *Ctenophthalmus* and the Mediterranean belt with but few species of the genus. We have here the interesting contradiction that in the Oriental Region the genus avoids the tropics, whereas in Africa it flourishes in the tropical districts and is poorly represented in the temperate south; a puzzle as yet unsolved.

The genera *Dinopsyllus* and *Xiphioptylla*, of which several species were collected, are purely Aethiopian, and the new bat-flea is likewise of an Aethiopian type.

Xenopsylla brasiliensis Baker 1904

UGANDA: Ruwenzori, Kilembe, on *Arvicanthis abyssinicus*, 15 ♂, 12 ♀.

Xenopsylla cheopis Rothschild 1903

UGANDA: Ruwenzori, Kilembe, on *Arvicanthis abyssinicus*, 1 ♂.

¹ Preliminary diagnoses of these four species were published by the author in 1937 (Novitates Zool., 40: 329-332), the full descriptions being given here for the first time.

Ctenocephalides felis strongylus Jordan 1925

UGANDA: Mt. Sabinio, Kigezi, on *Lophuromys aquilus*, 1 ♂.

Ctenophthalmus singularis Jordan 1936

KENYA: East side of Mt. Elgon, 11,000 ft., on *Otomys tropicalis elgonis*, 1 ♂, 2 ♀; *Otomys jacksoni*, 3 ♂ 2 ♀. Originally described from specimens obtained on Mt. Elgon.

Ctenophthalmus cabirus Jordan and Rothschild 1913

UGANDA: Ruwenzori, Kilembe, on *Arvicanthus abyssinicus*, 4 ♂; *Lemniscomys striatus*, 2 ♂, 4 ♀; *Otomys bacchante*, 2 ♂; *Lophuromys aquilus*, 1 ♂ 1 ♀.

Ctenophthalmus eumeces Jordan and Rothschild 1913

KENYA: East side of Mt. Elgon, 11,000 ft., ii. 1935, on *Rhabdomys pumilio diminutus*, 1 ♂; *Otomys tropicalis elgonis*, 1 ♂.

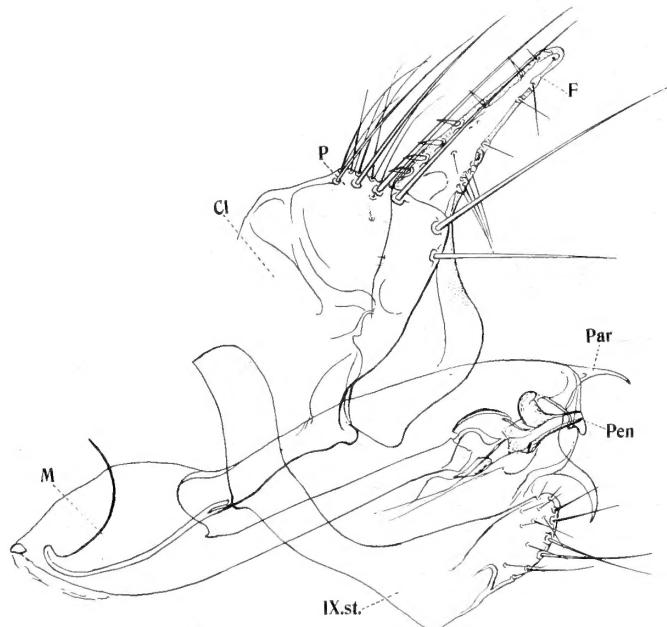


Fig. 1.—*Ctenophthalmus stenurus* Jordan.

Ctenophthalmus stenurus Jordan 1937 (Text-Fig. 1)

A near relation of *Ct. eumeces* Jordan and Rothschild 1913, differs very markedly in the genitalia. Process P of clasper (Text-Fig. 1), very broad,

truncate, apical margin straight, without the sinus present in *Ct. eumeces*; a row of six long bristles, four close to apical margin, one near rounded ventral angle and the sixth at ventral margin; on upper half of apical margin about eight slender bristles, some of them on outside, the others on inside of margin. The finger F of the clasper is the same type as in *Ct. eumeces*, but very much narrower in its apical half, while in the lower half it is strongly convex on the posterior (= ventral) side; the elongate-triangular apical setiferous portion bears dorsally seven spiniform bristles on one finger and eight on the other; at the ventral margin there is a cluster of three or four thin bristles a short distance from lower angle of P and three more between this cluster and apex. Ventral arm of IX.st. broader and shorter than in *Ct. eumeces*, being especially broad proximally; at margin about eight bristles, of which two are long, three smallish and three short, on side seven thin short ones. Phallosome of the *eumeces*-type, the dorsal and ventral apical hooks longer.

Length 2·6 mm.; hind-femur 0·41 mm.

KENYA: East side of Mt. Elgon, 11,000 ft., ii.1935, on *Rhabdomys pumilio diminutus*, 1 ♂.

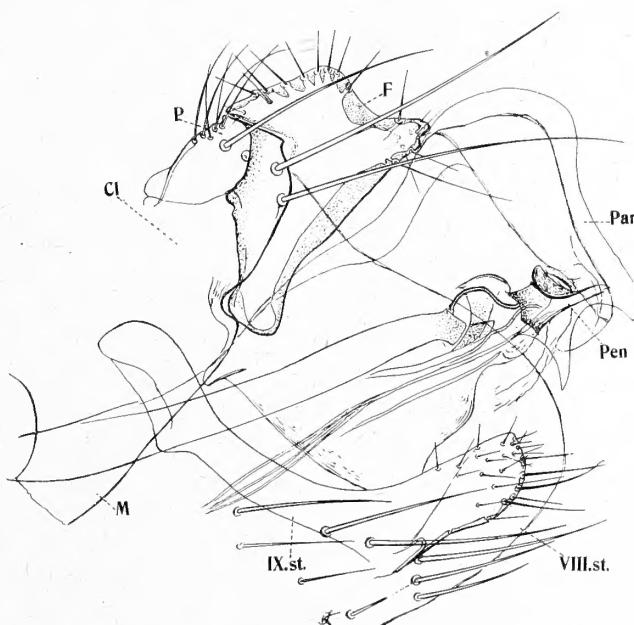


Fig. 2.—*Ctenophthalmus edwardsi* Jordan. ♂.

Ctenophthalmus edwardsi Jordan 1937 (Text-Figs. 2, 3)

A third species of group A (cf. Nov. Zool. 1913, 20: 545), agreeing with the diagnosis of the group except in the number of bristles on the metepimerum

being sometimes reduced to nine. As in *Ct. audax* Jordan and Rothschild 1913 and *Ct. triodontus* Rothschild 1907, the first and second genal spines are much broader than in other species, the second spine being almost round at apex (these spines, by a pen-slip, are referred to as bristles in the description of *Ct. audax*), and the subapical ventral bristle on the innerside of the mid- and hind-femora is slender. The species differs much in the modified segments.

♂. Process P of the clasper (Text-Fig. 2), as broad as dorsally long, ventrally and dorsally slightly rounded and apically truncate, close to dorsal and ventral

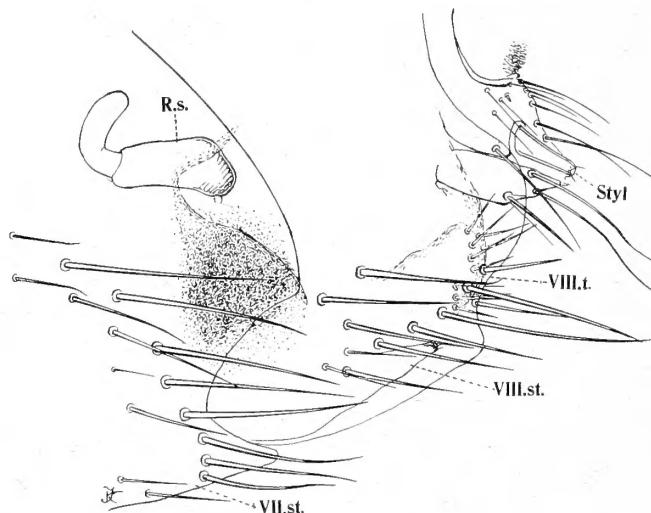


Fig. 3.—*Ctenophthalmus edwardsi* Jordan. ♀.

apical angles a small sinus; a transverse row of four long strong bristles, the upper two lateral, the third submarginal and the fourth marginal; dorsally a patch of about six slender bristles. Sclerite F unlike that of any other African species; roughly triangular, almost gradually widening from base, posterior (= ventral) margin a little longer than anterior margin and this a little longer than apical one; the apex medianly strongly convex, and between this convex portion and the ventral angle more or less incurved. Ventral arm of IX.st. broader and shorter than in the allied species, slightly variable in length; its apex ventrally strongly rounded, bearing about twenty bristles, of which three or four ventral ones are long, about the same size as the dorsal ones of process P of clasper. Phallosome (= armature and other accessories of ejaculatory duct) nearly as in *Ct. audax* apically very wide vertically, with two

ventral hooks each side (Par), the proximal one longer and narrower, more sharply pointed than the apical one.

♀. As in the allied species, VII.st. with deep sinus, which is rounded in the new species, with the lobes above and below it of nearly even length (Text-Fig. 3) ventral lobe narrow. The row of long bristles of VIII.t. distant from ventral margin; proximally the segment with a broadish incassation of the chitin, as indicated in figure. Stylet much shorter than in the allied species. Spermatheca not essentially different, its head very long.

Length of ♂ 2.3-2.6 mm.; ♀ 2.7-3.2 mm.; hind-femur of ♂ 0.37-0.40 mm.; ♀ 0.40-0.43 mm.

KENYA: East side of Mt. Elgon, 11,000 ft., on *Tachyoryctes*, 3 ♂, 8 ♀; *Otomys jacksoni*, 4 ♂.

It is interesting to note that in this species, as in many others, the number of lateral plantar bristles on the fifth segment of the hind-tarsus is often reduced from four to three. There being frequently four bristles on one side of the segment and three on the other, it is quite obvious that the bristle which has been reduced or has disappeared is the third lateral one, i.e. the bristle (rarely both bristles) of the fourth pair, counting the proximal ventral pair as the first.

Dinopsyllus lypusus Jordan and Rothschild 1913

UGANDA: Ruwenzori, Kilembe, on *Oenomys bacchante*, 3 ♂, 7 ♀; *Arvicantis abyssinicus*, 6 ♀; *Lemniscomys striatus*, 2 ♂. Mabungo, Kigezi, xi.1934, on *Ictonyx striatus*, 2 ♀.

Dinopsyllus longifrons Jordan and Rothschild 1913

KENYA: East side of Mt. Elgon, 11,000 ft., ii.1935, on *Otomys jacksoni*, 3 ♂, 6 ♀; *Rhabdomys pumilio diminutus*, 1 ♂; *Otomys tropicalis elgonis*, 1 ♂.

This series is very uniform and leaves no doubt that the ♂ and ♀ belong to the same species. The ♀ differ from those we have hitherto considered to be ♀ of *D. longifrons* in having apical spines on abdominal tergite I, none of our ♀ from other districts of Kenya (and Uganda) with numerous spines on tergites II to IV having a vestigial comb on I. This difference may mean that we have two races, one from the mountains (Elgon and Aberdare), and the other from lower elevations; or that all the ♀ without apical spines on I belong to *D. lypusus* Jordan and Rothschild 1913. All the above Mt. Elgon examples have three rows of bristles on the pronotum and bear the following numbers of apical spines on the abdominal terga (the numbers in brackets are those of the right side):

δ	I	II	III	IV	V	φ	I	II	III	IV	V
5(5)	10(9)	11(10)	13(14)	6(6)	1(2)		5(10)	10(9)	12(11)	2(2)	
2(2)	9(10)	11(9)	14(12)	6(4)		1(1)	9(10)	11(11)	12(10)	1(2)	
3(1)	8(8)	11(10)	12(11)	6(4)		5(3)	8(9)	10(9)	9(11)	1(1)	
5(5)	11(10)	11(12)	12(13)	7(6)		4(1)	8(8)	8(9)	9(9)	2(2)	
3(2)	8(11)	11(10)	12(12)	5(5)		1(1)	9(8)	10(9)	11(11)	2(2)	
						1(1)	8(7)	10(10)	11(11)	2(1)	

Average (both sides together): δ I 6.6, II 18.8, III 21.2, IV 25.0; φ I 3.7, II 16.5, III 19.3, IV 21.2, V 3.2.

Dinopsyllus semnus Jordan 1937 (Text-Fig. 4)

Close to *D. hirsutus* Rothschild 1908, of which only a single φ is known, found by Wollaston on *Mus univittatus lunaris* on Mt. Ruwenzori at 8000 ft. *D. echinus* Jordan and Rothschild 1913, from Kenya, Uganda and Lake Kivu,

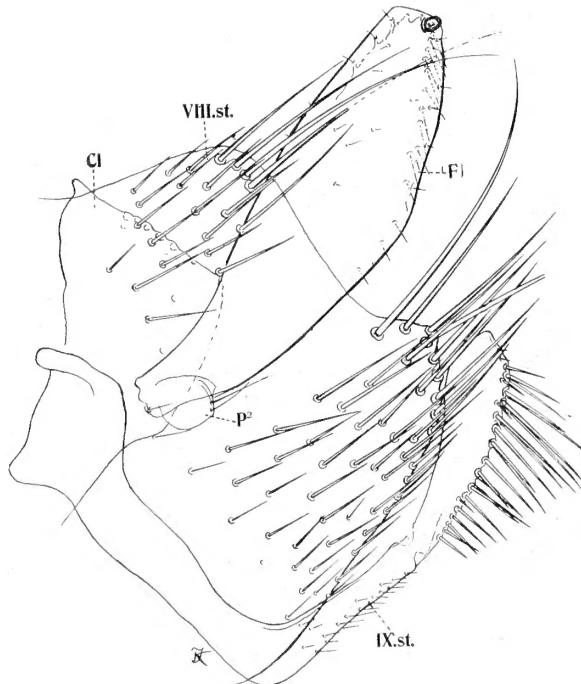


Fig. 4.—*Dinopsyllus semnus* Jordan.

is another nearly related species; the new species and *D. hirsutus*, however, can easily be separated from *D. echinus* and all the other known *Dinopsylli* by a character which has not yet been mentioned in the descriptions. In all species there are some small bristles on the side of the ninth tergite between the stigma of tergum VIII and the sensory plate (sensillum) of IX.t. In *D. hirsutus* and

D. semnus the bristles are much larger and more numerous than in other species, forming a conspicuous patch. Another distinction convenient for diagnostic purposes obtains in the ♂ only: the posterior rim of the sensory plate (sensillum) bears each side one, rarely two, slender bristles, whereas in the ♂ of *D. semnus* (and presumably also in the unknown ♂ of *D. hirsutus*) there are six or seven, of which one is half as long as the lower antepygidal bristle.

The present species is distinguished from *D. hirsutus* as follows: Pronotal comb with 44 spines in ♂, 46 in ♀ (in ♀ *D. hirsutus* 43). Metepimerum with 35 (33) bristles in ♂, 32 (19) in ♀ (*D. h.* 24 on both sides). Apical spines on abdominal terga II to V in ♂ 4 (4), 4 (4), 4 (4), 2 (1), in ♀ 5 (4), 5 (4), 4 (3), 1 (1) (in *D. h.* 5 (4), 3 (3), 2 (2), 0 (0)). Bristles on tergite IX behind stigma of VIII in ♂ 17 (17), in ♀ 19 (17?) (in *D. hirsutus* 9 (8) only). Lateral bristles on basal abdominal sternum (ventral ones excluded) in ♂ 21 (24), in ♀ 28 (34) (in *D. hirsutus* 18 (17)).

Modified segments. ♂ (Text-Fig. 4); VIII.st. with more bristles at and near upper and lower angles than in *D. echinus* ♂, the median area bare of bristles larger. Finger F broad, little more than thrice as long as broad, more convex ventrally than dorsally. Apex of vertical arm of IX.st. broader than usual; apical half of ventral arm very distinctive, the apex being little more rounded dorsally than ventrally, but feebly incurved below the tip, and the row of ventral bristles being continuous and extending to near the median joint of the segment. ♀; VII.st. similar to that of *D. hirsutus*, but its apical margin hardly at all incurved, the rounded lobes of *D. hirsutus* and *D. echinus* being absent. Marginal projection of VII.t. below antepygidal bristles as short and as strongly rounded off as in *D. echinus*. VIII.t. from stigma downward with an upper and a lower setiferous area separated almost sharply by a bare interspace, upper area with twenty-one bristles in the new species and fifteen or sixteen in *D. hirsutus*.

Length 6.0 mm.; hind-femur 0.5 mm.

UGANDA: Mt. Sabinio, Kigezi, xi.1934, on *Cricetomys*, 1 ♂ 1 ♀.

Xiphiosylla lippa Jordan 1933 (Text-Fig. 5)

KENYA: East side of Mt. Elgon, 11,000 ft., II, 1935, on *Otomys jacksoni*, 3 ♂, 4 ♀; *Tachyoryctes* spec., 1 ♀.

The spermatheca and bursa copulatrix being lost in the original ♀, we give a sketch of these organs from a ♀ of the present series.

Xiphiosylla hippia Jordan and Rothschild 1913

The same locality and date as the last, on *Otomys jacksoni*. 1 ♂. The occurrence of this species together with *X. lippa* is of interest, being evidence that the two insects are not geographical races, but distinct species.

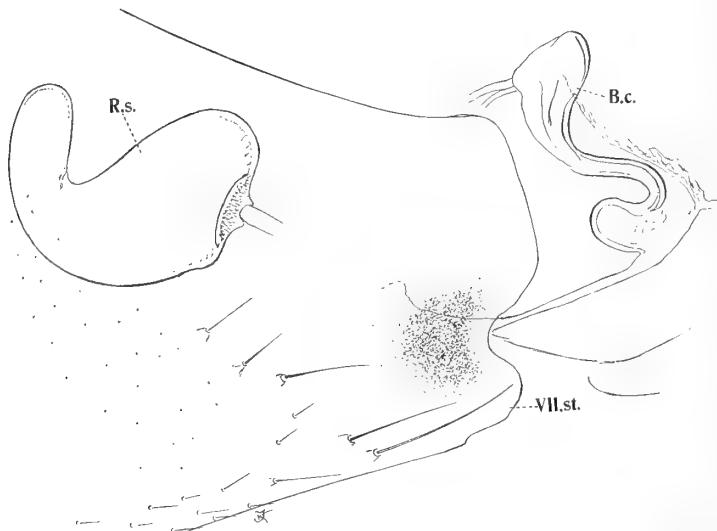


Fig. 5.—*Xiphioipsylla lippa* Jordan.

Ischnopsyllus ectopus Jordan 1937 (Text-Fig. 6)

Near *I. ashworthi* Waterston 1913, but distinguished from all African Ischnopsylli by the reduction of the metathoracic and abdominal combs.

Genal process truncate, its upper angle projecting, lower angle strongly rounded. On pronotum three rows of bristles; comb with nineteen spines. On mesopleura seven bristles, on metepimerum four one side, five the other (1, 2, 1 and 2, 2, 1). Comb of metanotum represented by two very short spines each side, less than twice as long as broad. Abdominal tergite I with two spines each side, close together, twice as long as broad, on II and III one each side; bristles on tergites III and IV 7, 13, and on sternites II and III two bristles, on IV, V and VI four, on VII six, on the two sides together. Legs (incomplete) similar to those of *I. ashworthi*.

Modified segments. VIII.st. (Text-Fig. 6) ventrally produced into a short lobe, which bears four long bristles at and near apex, and on side seven or eight shorter ones, some of them minute (most of the bristles missing in the specimen); in *I. ashworthi* the lobe is very much longer (i.e. the upwards portion of the segment much narrower in a horizontal sense), apically truncate and provided with two rows of long bristles, one row apical, the other close to it subapical. Clasper much longer than in *I. ashworthi*, its apex obliquely truncate, not sinuate, lower angle very strongly rounded, with three long bristles, upper angle very much less rounded, subacuminate; manubrium very broad. Sclerite F straight from near base, apically rounded on ventral (= posterior) side, ventral margin slightly incurved before the rounded apical portion; about a dozen small

bristles in apical half on the two sides of F, the longest one at beginning of apical curve of ventral margin. IX.st. strongly elbowed as in *I. ashworthi*, apical lobe triangular. Paramere (Par.) of phallosome long, narrow, pointed, slightly curved downwards.

Length (specimen extended in mounting) 2.5 mm.; hind-femur 0.48 mm.

KENYA: Mt. Elgon, from a bat taken in a cave at Kapretwa, Kitale, 6000 ft. 1 ♂.

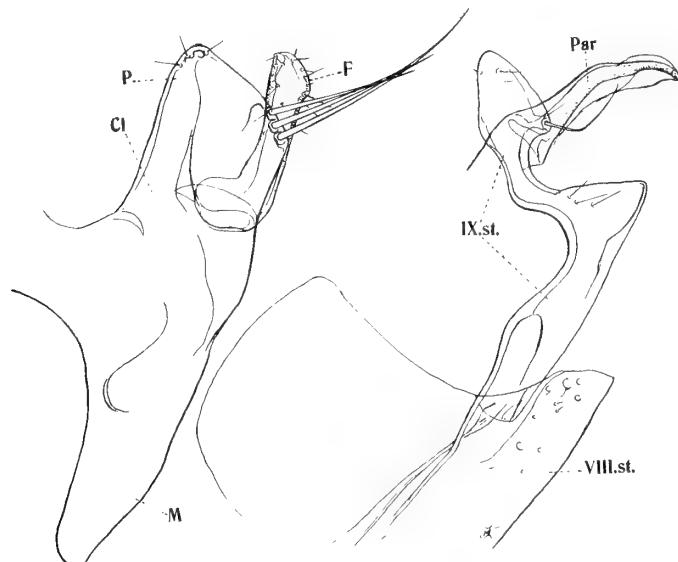


Fig. 6.—*Ischnopsyllus ectopus* Jordan.

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Plate IV
Mt. ELGON

Heath Zone on Mt. Elgon, alt. 11,000 feet, Koitoboss summit in background towards left.
Most of the rats from which *Ctenophthalmus edwardsi* Jord. and other fleas were obtained
were captured in this area

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